

Electronics Technician

ELECTRONICS 1

Levels: Grades 10-12
Units of Credit: Minimum 0.5
CIP Code: 470105
Prerequisite: None

CORE STANDARDS, OBJECTIVES, AND INDICATORS

STANDARD Students will be able to understand and demonstrate safe practices.
470105-01

OBJECTIVES

- 470105-0101 Use safe work practices. (A1)
- Describe the purposes of legislation concerning safety in the workplace.
 - Describe safety precautions and procedures pertaining to and working with electricity.
 - Describe correct safety procedures for hand and power tools.
 - Locate and describe shop safety equipment.
 - Use safe work practices.

STANDARD Students will be able to understand and demonstrate the use of shop tools, materials, and techniques.
470105-02

OBJECTIVES

- 470105-0201 Select and use hand and common power tools. (B1)
- Identify hand tools used by electronics technicians.
 - Describe the procedures to be used to care for hand tools.
 - Identify the proper use and care of power tools and their accessories
 - Select and use hand tools.
 - Select and use common power tools and their accessories.
- 470105-0202 Select and use hardware associated with electricity. (B2, B5)
- Identify nuts, bolts, screws, and washers.
 - Identify cable and wire support hardware.
 - Select and use hardware used by electronics technician.
- 470105-0203 Solder and desolder. (B3, B5)
- Explain the principles of soldering and desoldering.
 - Describe appropriate soldering techniques such as tinning, physical connections, temperature selection, and cleaning.
 - Describe the precautions to prevent electrostatic discharge (ESD) during soldering.

- On a P.C. board solder and desolder ICs, wire and discrete components.
- Show appropriate use of heat sinks on solid state components.

STANDARD 470105-03 Students will be able to understand and demonstrate the use of test equipment.

OBJECTIVES

470105-0301 Use multimeters – digital and analog. (C1)

- Describe the proper handling, storage and use of digital meters.
- Describe the proper handling, storage and use of analog meters.
- Use multimeters.

470105-0302 Use bench power supplies. (C2)

- Describe the operation of a bench power supply and its controls.
- Use power supplies.

STANDARD 470105-04 Students will be able to understand and demonstrate how to test and select passive electronics components.

OBJECTIVES

470105-0401 Identify electronic components. (D1)

- Identify electronic passive components i.e. resistors, capacitors, and inductors.
- Using standard electronic multiplication prefixes, determine the values for electronic components from their markings and physical characteristics.
- Identify electronic components.

470105-0402 Use, test and select batteries. (D2)

- Describe the construction, operation, testing and maintenance of batteries.
- Use, test, and select batteries.

470105-0403 Use, test and select resistive devices. (D3)

- Describe the principles of resistance.
- Identify resistive devices and draw their schematic symbols.
- Describe the function of resistive devices.
- Describe the procedures for testing resistive devices.
- Use, test and select resistive devices.

470105-0404 Use, test, and select switches and relays. (D4)

- Describe switch types, schematic symbols and operation.
- Describe relay types, their major parts, schematic symbols and operation.
- Describe procedures for selecting, connecting and testing switches and relays.
- Connect, test and select switches.
- Test, select and connect relays.

STANDARD 470105-05 Students will be able to understand and demonstrate induction.

OBJECTIVES

470105-0501 Describe principles of magnetism and electromagnetism learning. (F7)

- Explain the principles of magnetic fields.
- Explain the principles of electromagnetic fields.
- Describe the operation and application of magnetic devices.
- Describe the principles of electromagnetic induction.

STANDARD 470105-06 Students will be able to understand and demonstrate capacitors & their application.

OBJECTIVES

470105-0601 Use, test, and select capacitors. (D8)

- Describe the principles of operation of capacitors.
- Describe the common types of capacitors, their schematic symbols, major parts and uses.
- Describe the operation of capacitors in DC and AC circuits.
- Describe the procedures for selecting, testing and connecting capacitors in series and parallel circuits.
- Use, test, and select capacitors.

STANDARD 470105-07 Students will be able to understand and demonstrate how use transformers.

OBJECTIVES

470105-0701 Troubleshoot transformer circuits. (G3)

- Describe the procedure for constructing, testing, and troubleshooting transformer circuits.

STANDARD 470105-08 Students will be able to understand and demonstrate basic electronic theory.

OBJECTIVES

470105-0801 Describe basic principles of electrical theory. (F1)

- Describe the atomic structure of matter.
- Describe the units of electrical charge, voltage and current.
- Describe the factors that affect the movement of electrical charges.

470105-0802 Verify ohm's law and power equations. (F2)

- State Ohms Law and graph the relationships between voltage, current and resistance in circuits.
- Use formulas and basic mathematics to solve Ohms Law problems.
- Use formulas to calculate electric power requirements.
- Describe the effect on power requirements of changing voltage, current or resistance on power.
- Describe power dissipation in resistive devices.

- From schematic diagrams, predict the voltage, current, and resistance in all parts of a circuit.
- Determine proper power ratings for resistors.
- 470105-0803 Construct, measure and analyze simple series resistive circuits. (F3)
 - Describe the principles of series circuits.
 - Calculate the voltage across, current through, equivalent resistance of and power dissipation for any component or group of components in a series resistive circuit.
 - State and use Kirchoff's voltage law and the voltage divider formula.
- 470105-0804 Construct, measure and analyze simple parallel resistive circuits. (F4)
 - Describe parallel circuit principles.
 - Calculate the theoretical values of voltage, current, resistance and power in all parts of the circuit.
 - State and use Kirchoff's current law and the current divider formula to solve parallel circuit problems.

PROFESSIONAL DEVELOPMENT

STANDARD **The student will understand the need for professional development.**
470105-14

OBJECTIVES

- 470105-1401 Complete a personal inventory.
- 470105-1402 Set and meet goals.
- 470105-1403 Be self-motivated.
- 470105-1404 Know how to make decisions.
- 470105-1405 Know how to manage time.
- 470105-1406 Organize personal belongings and equipment.
- 470105-1407 Learn to communicate verbally.
- 470105-1408 Write effective communications.
- 470105-1409 Establish a personal reading program.
- 470105-1410 Develop effective work skills and attitudes.
- 470105-1411* Master a working knowledge of SkillsUSA.
 - State the SkillsUSA motto.
 - State the SkillsUSA creed.
 - Learn the SkillsUSA colors.
 - Describe the official SkillsUSA dress.
 - Describe the procedure for becoming a SkillsUSA officer.

STANDARD **The student will understand the need for leadership skills.**
470105-15

OBJECTIVES

- 470105-1501 Serve on a committee.
- 470105-1502 Prepare an agenda.

470105-1503	Assist in planning a meeting.
470105-1504	Review basic parliamentary procedure. <ul style="list-style-type: none"> ▪ Make a main motion.
470105-1505	Participate in a school project.
470105-1506	Attend a community meeting.
470105-1507	Practice effective speaking.
470105-1508	Present a three- to five-minute talk.
470105-1509	Implement a leadership project.
470105-1510*	Master a working knowledge of SkillsUSA. <ul style="list-style-type: none"> ▪ Describe the meaning of the SkillsUSA emblem. ▪ State the SkillsUSA pledge. ▪ Describe the duties of a SkillsUSA officer.

STANDARD **The student will understand the need for career planning.**
470105-16

OBJECTIVES

470105-1601	Define your future occupation.
470105-1602	Survey employment opportunities.
470105-1603	Report on a trade journal article.
470105-1604	Explore opportunities for advanced training.
470105-1605	Conduct a worker interview.
470105-1606	Contact a professional association.
470105-1607	Explore entrepreneurship opportunities.
470105-1608	Give a talk about your career.
470105-1609	Review career goals.

STANDARD **The student will understand the importance of employability and**
470105-17 **work habits.**

OBJECTIVES

470105-1701	Develop a list of work standards to follow at school and on the job.
470105-1702	Evaluate your personal ethics. <ul style="list-style-type: none"> ▪ Evaluate your personal ethics against acceptable workplace ethics.
470105-1703	Build a job search network.
470105-1704	Find job leads.
470105-1705	Write a resume.
470105-1706	Create a job portfolio.
470105-1707	Complete a job application.
470105-1708	Write a business letter and memo.
470105-1709	Participate in an actual or simulated job interview.

* SkillsUSA PDP requirements - optional but recommended.

